

**ABSTRACT OF THE DISCLOSURE**

A method of generating cells predominantly displaying at least one characteristic associated with a cardiac phenotype is disclosed. The method comprises (a) partially dispersing a confluent cultured population of human stem cells, thereby generating a cell population including cell aggregates; (b) subjecting said cell aggregates to culturing conditions suitable for generating embryoid bodies; (c) subjecting said embryoid bodies to culturing conditions suitable for inducing cardiac lineage differentiation in at least a portion of the cells of said embryoid bodies, said culturing conditions suitable for inducing cardiac lineage differentiation including adherence of said embryoid bodies to a surface, and culture medium supplemented with serum, thereby generating cells predominantly displaying at least one characteristic associated with a cardiac phenotype.